crystalline. But when we come to the tissues we are dealing no longer with organic substances, but with organized beings, and feel that we are approaching the barriers which separate the study of life from the study of matter. The bonds which unite them are so close that we cannot imagine life *without* matter, and it is equally difficult to conceive the assumption of vitality *by* matter; but we must never cease to look anxiously for the solution of the problem. The impossible is a horizon which recedes as we advance, and the *terra incognita* of to-day will to-morrow be boldly mapped upon every schoolboy's chart! —*Am. Journal of Science and Arts*, Nov. 1868.

MATERIA MEDICA, GENERAL THERAPEUTICS, AND PHARMACY.

8. *On Bloodletting as a Point of Scientific Practice.*—Dr. B. W. RICHARDSON, in concluding his able address just delivered before the Medical Society of London, summarized his views as follows:—

I would recall that bloodletting, as a point of scientific practice, is still open to us in some stages of typhus fever; in cases where there is a sudden tension of blood, of which sunstroke is an example; in cases of chronic congestion of brain; in cases of acute pain from serous membrane; in some classes of spasmodic pain; in cases of sudden arrest of circulation from concussion; in cases of congestion of the right heart; and, it may be, in extreme cases of hemorrhage. Above all, I claim for it a first place in treatment of simple uræmic coma.—*The Practitioner*, Nov. 1868.

9. *Influence of Chloride of Sodium and of Potassium on the Assimilation and Excretion of Iron by the Organism.*—Dr. N. WORONICHIN has made some researches on this point. It is well known, of course, that not only is iron taken up into the system with our ordinary daily food, but also that it overflows, so to speak, to a certain small extent in the urinary secretion, the feces, etc. Dr. Woronichin fed the dogs on which he experimented with a food which was entirely free from iron—namely, casein prepared free of fat, and distilled water. Comparative experiments were then made by adding soda and potash chlorides respectively to their food. The general results which came out are decided and interesting. Chloride of potassium does very notably increase the quantity of excreted iron; and it is obvious from the wasting of the animals, and from the specific gravity and the otherwise easily estimable characters of the urine, it is certain that this must be due to increased consumption of tissues. The total quantity of urine, moreover, is considerably increased under chloride of potassium. Chloride of sodium, on the other hand, does not produce by any means such a copious elimination of iron in the urine, but it appears to greatly assist the assimilation of iron. Zabelin had already showed that iron, when given internally, is not absorbed by itself simply, but that the process is affected by the agency of chloride of sodium. The very important result, therefore, flows from Woronichin's researches—that the administration of chloride of sodium simultaneously with iron enables a considerable proportion of the iron to be stored up in the organism; while a similar amount of chloride of potassium would have caused nearly all the iron exhibited to be discharged in the secretions.—*The Practitioner*, Dec. 1868, from *Wiener Medizinische Jahrbuch*, 1868, ii.

10. *On the Action of the Salts of Iron when introduced directly into the Blood.*—In the number of this Journal for January, 1848, will be found a *résumé* of a series of experiments made by Dr. JAMES BLAKE, now of San Francisco, Cal., with the view of ascertaining the effects produced on living animals by the introduction of inorganic compounds directly into the blood. From those experiments, which were very numerous, made with compounds of twenty-nine

of the elementary bodies, the result arrived at was, that these organic compounds when introduced directly into the blood, give rise to reactions connected with their isomorphous relations, or that isomorphous substances produce analogous reactions. This law was verified as regards all the more important isomorphous groups, including compounds; in the magnesian group, of iron, zinc, manganese, copper, cadmium, lime and magnesia; in the platinum group, of platinum, palladium, osmium and iridium; in the arsenic group, of arsenic, antimony and phosphorus; in the chlorine group, of chlorine, bromide and iodine; in the potassium group, of potassa, ammonia, soda and silver; in the baryta group, of baryta, strontia and lead; in the alumina group, of alumina, ferric oxide and glucina; in the sulphur group, of sulphur and selenium.

In the number of the *Journal of Anatomy and Physiology* for November, 1868, Dr. Blake related some experiments performed by him with the salts of iron. The fact that this metal forms oxides, the salts of which are widely different in their isomorphous relations, renders the investigation of its action in connection with the above law of considerable importance, and the part that this metal plays in the physiology of the blood, adds a still greater interest to any facts connected with its reactions.

"The quantity of the different salts required," he states, "to produce death is extremely different, for whilst 60 to 70 grs. of the protosalt can be circulated in the blood without producing any fatal symptoms, four or five grains of the persalt will destroy life.[1]

"As regards the action of the salts of iron on the heart, the protosalts evidently tend to diminish its irritability, as the pulsations become slower and the pressure in the arteries diminishes. In larger doses the action of the heart is arrested. The persalts, on the other hand, appear not to exert any direct action on the heart; they certainly do not diminish the strength of its contractions, or it would not go on beating under the enormous pressure to which its internal surface must be submitted, when the arterial pressure is equal to 12 inches of mercury."

"The action of the protosalts on the nervous system shows itself in slower respiration, a peculiar state of quietness, in which the animal does not wish to move, although it has the power and is perfectly sensible, and by inducing vomiting. When introduced directly into the arteries, death is caused by its action on the nervous system. It is probable that the general effects produced by the persalts are owing to the important changes caused in the circulation. On first injecting it into the veins, the pulmonary circulation is arrested and venous congestion results: the supply of blood to the left side of the heart being cut off, the circulation of arterial blood through the body is almost suspended. When injected directly into the arteries the curious nervous phenomena that result are probably owing to the great pressure to which the nervous centres are submitted, and which appears to abolish entirely the functions of the encephalon, although respiration and heart pulsation are kept up for some minutes. As to the cause of the final cessation of the respiratory movements, I am inclined to think that it is owing to the effect of continued pressure producing some state of the nervous tissue which interferes with its reflexibility, and not owing to any chemical changes caused by the presence of the salt in the blood. In the more appreciable physical changes produced in the blood the two classes of salts are as different in their action as in every other respect. The protosalts give rise to changes in the blood which prevent its coagulation after death, whilst the salts of the peroxide do not at all interfere with its coagulation, but I believe render the clot firmer. Such are the more striking facts caused by the introduction of the ferrous and ferric salts directly into the blood. The difference in the physiological reactions produced by two classes of salts of the same metal is in itself a curious fact, but it becomes, I think, far more interesting when we find that these two classes of salts of the same metal, differing so strongly in their physiological action, yet have their strict physiological analogues in salts of other metals very different from iron. Thus the substances which, when introduced directly into the blood, produce effects analogous to the protosalts of iron, are the salts of magnesia, zinc, nickel, copper, and cadmium; whilst the salts that are analogous to the ferric salts in their physiological action are the salts of alumina and glucina. On the important bearing of these facts on the question of isomorphism and physiological reactions it is needless to enlarge. As regards the chemistry of respiration, the above experiments would show that the salts of the protoxide of iron, although so readily passing to a higher degree of oxidation when out of the body, are in some way preserved from the action of oxygen when mixed with the blood. Were not this the case a sufficient quantity of the persalt to prove fatal would soon be formed when fifty to seventy grains of the sulphate had been introduced into the blood. On the other hand, it would seem that the salts of the peroxide cannot be rapidly reduced whilst circulating with the blood, otherwise the effects of the small quantities used in some of my experiments would not have been so persistent."

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[1] "The poisonous properties of the persalts of iron should lead to caution in their employment. I have seen deaths recorded after the use of these salts for the destruction of nævi in which I have no doubt the hæmadynamometer would have shown obstruction in the pulmonary circulation. In the *Berlin Allgemeine Med. Cent. Zeitung* for January 11th, 1868, a death is recorded in which the symptoms plainly indicate fatal pulmonary obstruction."

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11. *Action of Narceine.*—Dr. JOHN HARLEY, whose valuable investigations in regard to the action of several narcotics we have referred to in the previous Vol. of this Journal, has instituted experiments to determine the action of narceine. He very justly remarks that much confusion exists with regard to the properties of this substance, and quotes in proof of this the statements of Claude Bernard, Béhier, Debout, Eulenberg, Liné, Da Costa, Oettinger, etc.

The following are his own conclusions: 1st. That narceine is a pure *hypnotic*, but that its action is so very feeble that 5 grains or more are required to induce a slight tendency to sleep, when the medicine is given in powder or solution by the stomach; and that, when introduced by the skin, 1 grain is equivalent to only ⅛ of a grain of morphia at most. 2d. That it is impossible to reduce this quantity to the state of a non-irritating solution of such bulk that it may be introduced by one or two punctures, without risk of inducing subcutaneous inflammation. 3d. Granting that an efficient dose may be introduced beneath the skin without inconvenience, evidence is wanting that it possesses any advantage over morphia. 4th. That narceine is, therefore, practically useless as a medicine. 5th. Narceine kills by depressing and ultimately paralyzing the respiratory movements.—*The Practitioner*, Nov. 1868.

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12. *Therapeutical Action of Veratrum Viride.*—M. OULMONT, in a memoir on this subject presented to the Academy of Medicine, states that he has employed the resinous extract made up into granules of one centigramme each, one of these being given every hour until vomiting takes place, this usually occurring after the third dose, although sometimes not until after the seventh or eighth. These short intervals are indicated by the fugitive character of the action of the medicine, and by the fact that this is not cumulative. Being aware of the elective action it exerts on febrile phenomena, M. Oulmont has administered the substance in cases of acute pneumonia, acute articular rheumatism, pleurisy, and typhoid fever. The following conclusions are drawn: 1. The veratrum acts directly by lowering the pulse and temperature, the former at the end of three or four hours diminishing by from twenty to fifty beats. The temperature lessens much more slowly, so that it is diminished by from a half degree to 2° C. only after three or four days. 2. The dose requisite to produce these effects is from 3 to 7 centigrammes per diem, and for durable effects to be produced, it must continue during three or four days. 3. It exerts a very favourable influence in simple pneumonia, the mean duration of which is reduced by its aid to 6¾ days, while the mortality is less under this mode of treatment than under any other. Its action on the local condition is only indirect by arresting the progress of the disease and hastening on resolution. According to Dr. Kocter, of Berne, the mortality of pneumonia treated by veratrum is but 8.3 per cent., while it is 13.5 by the expectant treat-